Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PROBLEMS.

392. *By George Eastwood, Saxonville, Mass.*—In a triangular pile of round shot, each shot rests upon three other shot, thus forming an empty space. It is required to find the ratio of the capacity of all the spaces to the capacity of all the balls.

393. *By J. M. Boorman, Esq., New York City.*—State the general equation of the 4th degree in terms whose coefficients shall be real and direct functions of its roots and admit a solution showing the root's *real* nature—no root to be directly *expressed* by a letter.

394. *Id.*—Show that the general equation of the 4th degree has its companion biquadrate, and state it and the respective relat'ns of their roots.

395. *By C. O. Boije of Gennas, Gothenburg, Sweden.*—Determine the law of density of a sphere in order that its centre of gravity may be coincident with the centre of gravity of the half sphere cut off from the sphere.

396. *Selected by Prof. H. T. Eddy.*—A smooth horizontal disk revolves with the angular velocity $\sqrt{\mu}$ about a vertical axis at which is placed a material particle attracted to a certain point of the disk by a force whose acceleration is $\mu \times$ distance; prove that the path on the disk will be a cycloid. (Routh's Rigid Dynamics, p. 163.)

397. *By Prof. J. M. Rice, U. S. Naval Academy.*—Given

$$\varphi(x^2)\,\varphi(y^2) = \varphi(x'^2)\,\varphi(y'^2)$$

and

$$x^2 + y^2 = x'^2 + y'^2,$$

to determine the form of the function denoted by φ.

398. *By Wm. Hoover, A. M., Dayton, Ohio*—An angular velocity having been impressed upon a heterogeneous sphere, about an axis, perp. to the vertical plane which contains its center of gravity G and geometrical center C, and passing through G, it is then placed on a smooth horizontal plane; to find the magnitude of the impressed angular velocity that G may rise into a point in the vertical line SCK through C, and there rest; the angle GCS being a at the beginning of the motion, c, the radius, and φ the req'd angular velocity.

399. *By E. J. Esselstyn, New Haven, Conn.*—Given two points A and B, and a circle K having its centre at O. Let any circle L be drawn thro' A and B so as to cut the circumf. of the circle K in two variable points m and n. Show that the circle through O, A and B is cut by the variable circle through O, m and n, in a fixed point P.

400. *By Prof. Asaph Hall.*—In a plane passing through the centre of the sun, 12 right lines are drawn from this centre making an angle of 30° with each other. On each of these lines, three homogeneous spherical bodies are placed at distances respectively of 10, 20 and 30 from the centre of the sun; the distance from the earth to the sun being the unit of distance.

The mass of each of these bodies being equal to that of the sun, what will be the velocity of a particle that starts from an infinite distance and moves in a right line towards the centre of the sun, and perpendicular to the plane of the bodies, when the particle is at a distance of 0.01 from the centre of the sun; the law of attraction being that of Newton?

QUERY BY GEORGE EASTWOOD.—In the solution of problem 389, show *why* "It is allowable and sufficient to write

$$\frac{dp}{dt} = p^2, \text{ and } \frac{dq}{dx} = q^2\text{''}.$$

PUBLICATIONS RECEIVED.

Theory of the Moon's Motion. Deduced from the Law of Universal Gravitation. By JOHN N. STOCKWELL, PH. D. 378 pp. Large 8vo. Philadelphia: J. B. Lippincott & Co. 1881.

A Sequel to the first Six Books of the Elements of Euclid, Containing an easy Introduction to Modern Geometry, with numerous examples. By JOHN CASEY, LL. D., F. R. S. Dublin: Hodges, Figgis, & Co. London: Longmans, Green, & Co. 1882.

A Treatise on the Theory of Determinants. By THOMAS MUIR, M. A., F. R. S. 240 pp. 8vo. Macmillan & Co. London.

I.—The Law of Extensible Minors in Determinants: II.—On some Transformations connecting General Determinants with Continuants. By THOMAS MUIR, M. A. 14 pp. 4to.

Micrometrical Measurement of 455 *Double Stars,* under the Direction of ORMOND STONE, A. M., Astronomer. 69 pp 8vo. Cincinnati. 1882.

A Value of the Solar Parallax from Meridian Observations of Mars. By PROF. J. R. EASTMAN. 43 pp. 4to. Washington. 1882.

The American Journal of Mathematics, Vol. IV, No. 2.

This number of the Journal is wholly devoted to the publication of the late PROFESSOR BENJ'N PEIRCE'S *Linear Associative Algebra.* With Notes and Addenda by C. S. PEIRCE, Son of the Author.

The Mathematical Visitor, Vol. II, No. 1. By ARTEMAS MARTIN, M. A., Erie, Pa.

ERRATA.

On page 49, line 15, for "laws", read locus.
" " 50, " 22, insert m_5 after 1046.02.
" " 85, " 1, insert " after "*Lune*".